

# AVIATION WEEK

SEPT. 8, 1947

INCORPORATING AVIATION AND AVIATION NEWS A MCGRAW-HILL PUBLICATION

FOR AIRCRAFT ENGINES . . . AIRCRAFT SPARK PLUGS

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*chooses* **BG** *Spark Plugs Exclusively*  
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to meet the ever increasing  
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and Improved Product Quality



Vickers Hydraulic Controls have played a significant part in the development of many modern machine tools because they provide the designer with opportunities for improvement not available by other methods. From simple machine tools to completely automatic processing machines, Vickers Hydraulic Equipment makes good machines even better.

You can see the many advantages which Vickers Hydraulic Controls have contributed to modern machine tools in more

than 30 booths at the Machine Tool Show—booths of machine tool builders who are displaying Vickers Hydraulic equipped machines of many types. It will be very much worth your while to inspect these machines.

To make it easy for you to find these exhibits, we have prepared a booklet illustrating the machines, listing the names of the manufacturers and showing their booth locations. Stop at Vickers booth No. 228 for your copy.

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1041

### BOOTH 228

Here you will see the latest developments in Vickers Hydraulic Controls. Vickers Application Engineers will be glad to discuss your individual problems.



## Rubber erases some old ideas about flying

FLYING used to be considered a "fair weather" proposition. During a good part of the year, flying conditions kept planes on the ground.

They B F Goodrich engineers worked out a way to remove ice from wings and tail surfaces. Engineered with B F Goodrich De-Icers, airlines found they could operate all year round. And as a result, these rubber De-Icers now protect the wings and tails of almost every airline and many smaller planes as well (photo upper left).

Today, B F Goodrich rubber is erasing other old ideas about flying too. The newest B F Goodrich use is a good example. It's the smallest

site ever used on a plane's main wheels. Yet it loads a 20,000 pound load in the fastest time in history! D F Goodrich Expander Tube breaks combat with B F Goodrich cars, buses and wheels to improve landings, take-offs and taxiing for all types of planes (photo upper right). Added safety is provided by a new B F Goodrich product—electrically heated rubber. It keeps ice from forming on propellers, cowings, water tanks, hydraulic lines, and other installations. And it has proved the most efficient way of getting the right amount of heat to a specific spot (photo lower left).

For comfortable, attractive, durable

able cabins, B F Goodrich supplies springs rubber seats, cushioning flooring materials, and interior trim for cockpits, walls, aisle seats, rugs and many other uses (photo lower right).

Many, many more B F Goodrich products are widely used on today's planes. And B F Goodrich is constantly working on developing new products to make planes even better, cheaper and safer. The B F Goodrich Company, Americal Division, Akron, Ohio.

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# AVIATION WEEK

Vol. 47 No. 10

Sept. 8, 1947

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Researcher: F. L. Peterson, V. Glavin, A. L. Smith, W. D. Lister

Executive and Editorial Offices: 110 W. 42nd St., New York 36, N. Y., National Press Bldg., Washington 4, D. C.

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## "We get better threads and save a washing operation with Gulf Cut-Aid"

says this foreman



The Foreman is checking thread finish and size of a 3/4-inch 11x8 nut tapped on a lathe. The nut is 11x11, 1/2 inch thick. (Photo courtesy of Carbon Steel Division, American Hardware Company, New Britain, Conn.)

"WE greatly improved the performance of our nut tappers by the use of Gulf Cut-Aid," says this Foreman. "We not only eliminated a washing operation—we're getting a better finish on the threads, and longer tool life."

Though it is generally recommended for machining nonferrous metals, scores of shops report that Gulf Cut-Aid is excellent for tapping low carbon steel nuts.

Call in a Gulf Lubrication Engineer today and let him help you find opportunities for greater production at lower cost through the use of Gulf quality cutting oils. Write, wire, or phone your nearest Gulf office.

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A, B and C	

It's sooner than you think...

For all better aluminum products—only with Kaiser Aluminum

a Permanente Metals product

## What things do you think of when we say "aluminum"?

When asked this question in a recent survey, 90% of the people answered: "Pots and pans."

On the other hand, less than 4% mentioned such common "materials" as building and mining, housing and remodeling, equipment, garages and downspouts, boats, garage doors, garden tools, home-crafts.

What does this mean?

Simply that while aluminum has proved itself the successor of other metals in hundreds of applications, public awareness has largely remained at the pot-and-pan level. And without awareness, how can there be demand?

To increase consumer awareness of the

advantages of aluminum, we encourage them to learn of better living and then create demand...as the objective of the above advertisement and the story that will follow.

They will appear in full color, as such top and magazine on Sunday Evening

Post, Newsweek, Collier's, Time, Success, reaching a total audience of over 10 million every month! Such advertising, we believe, is bound to influence the buying behavior of a big share of the audience.

Which will mean a far more business for the makers of aluminum products.

Ready to serve you—*only*...

# Kaiser Aluminum

a Permanente Metals product

DISTRIBUTED BY PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND, CALIFORNIA. WITH OFFICES IN: New York, Oakland, Calif., Los Angeles, Calif., Dallas, Texas, Wichita, Kan., Kansas City, Mo., St. Louis, Mo., Detroit, Mich., Minneapolis, Minn., Milwaukee, Wis., Chicago, Ill., Cincinnati, Ohio, Cleveland, Ohio, Denver, Colo., Des Moines, Iowa, Hartford, Conn., Indianapolis, Ind., Jacksonville, Fla., New Orleans, La., Philadelphia, Pa., Pittsburgh, Pa., St. Paul, Minn., San Francisco, Calif., Seattle, Wash., St. Louis, Mo., Tampa, Fla., Washington, D.C.

**BATTLE OF ENGINES**—The toughest Thompson Trophy Race in national air race history was primarily a battle of engines. Cook Cichold's two record-breaking Goodrich P-39's were powered with the 28 cylinder Pratt & Whitney Wasp engines rated at 3,500 hp. with a 4,300 cubic inch displacement. Their closest competitors, the full P-39 piloted by ex-fighter test pilot Jay Denenberg, was powered by an Allison V-1710 rated at 1,625 hp. with less than half the Wasp major's displacement.

Denenberg won first off the ground and held the lead for four laps before engine power put his former Navy plane into an inert to stop. Even with the power duck stacked against him Denenberg kept his P-39 on the tail of the second place P-39 all the way outstripping 189 mph (~45 mph faster than Tex Johnston's winning time in the same plane last year.

**NAVY VICTORY**—Cook Cichold's flyer in Goodrich Corsair operations was strictly a Navy triumph and was interpreted by the on-going contingent at the races Cichold who is now a Goodrich field base operator, was a Navy dive bomber. Richard Bentz who flew the second place Corsair was a Navy test pilot at Patuxent and a now chief mechanic at Cichold's airport. Tony Janssen who was killed flying Cichold's third Corsair was a former Navy fighter pilot.

Cichold's Corsairs were part of an experimental Navy order for 30 and were made by Goodrich at its Alcoa aircraft plant. The planes were completed in the fall of 1945. They weighed 15,000 lb. in comparison with 9,800 lb. for the Chance Vought Corsair.

**PAPER FIGHT**—Navy also traded off with losses in the public relations skirmish. AAF show was originally built around Col. Albert Boyd and the Lockheed Shooting Star (P-38) as holder of the world speed record and first march of its patch from the badly recovering stricken by the second bombing Douglas D-58 performance less than two weeks before the races. Mathematically draw of Col. Robert "God Is My Copilot" Scott on the public address system also helped to slow the pace of the AAF performance. Navy exhibited all types from Grumman Bearcats to McDonnell Phantom in a snappy aerobically parade punctuated by simulated dive-bombing and strafing attacks. TNT bomb explosions, air raid sirens and chattering sub-aerial fire that literally panned the crowd onto the edge of their seats.

**BATTERED JETS**—AAF fighter pilots in Lockheed Shooting Stars took top honors for the most rugged performance in the racing program. Competing for the Jay Thompson Trophy they finished around the 15 mile course at better than a 500 mph clip that saw several planes and pilots take issue with 12g's on the pylon turn. One P-38 smashed through a flight of birds that tore off

part of the canopy, battered a wing and fouled the air duct. Other planes had bent prop, bentled fuselages, popped rivets and denied wings to show for the terrific groll that battered the pilots as hard as their planes.

**RACING FUTURE**—Stirred by the fast crashes in the accompanying Thompson race that killed one and injured two other pilots, the National Racing Flyer Association met in Cleveland after the races to deliberate on the future of closed course racing. Many feel that the pace of current jet and piston planes is too fast for the 15 mile squared cage laps of the Thompson course.

Despite a violent thunderstorm that washed out the opening day's program attendance reached 138,000 for the two screaming days ensuring continuance of the race for at least another year. Thompson Products president Fred Crawford, who also heads the air race management, indicated races will be continued on a year to year basis depending on success of each year's performance.

**MANUFACTURERS PLEAS**—Aircraft manufacturers are preparing strong pleas on the importance of their individual roles in the national defense picture for President Truman's Air Policy Commission when it studies its transportation survey of manufacturing facilities next month. Tentative schedule calls for visits to Wright Field, Kansas City, San Diego, Los Angeles, Moffett Field and Seattle beginning Oct. 5. Some manufacturers not being visited are highly concerned over lack of opportunity to tell their story. Actually the tour and the commission will have little to do with determining success in the industry. Main purpose of the trip is to acquaint commission members, most of whom have never seen an aircraft plant, with the industry and military aviation generally. Final word on which manufacturers are to be kept alive by Air Force and Navy contracts still rests with the military not the civilian commission.

**SECURITY AND CENSORSHIP**—Army and Navy are getting pressure on some segments of the aircraft industry to send representatives to top officials of McGraw-Hill Publishing Co. to make a pre-arranged interview with and "validation of security." This magazine does not intend its print to Army and Navy sponsored press releases. Public relations people among Eastern manufacturers have shown more signs of giving in to Army and Navy wishes, and have asked Western members of the National Public Relations Association of AIA to discuss the matter. Western manufacturers so far have shown little enthusiasm for participating in the project. The matter is important, not because it is this publication which is involved, but because it may be another indication that the whole subject of postwar censorship will break out into the open, involving the nation's press generally.

# ERIE Gasoline-Dehydrators

Size Sizes  
25 G P M  
40 G P M  
80 G P M  
100 G P M  
200 G P M  
350 G P M



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## NEWS DIGEST

### DOMESTIC

Julia R. Mason, Assistant Secretary of Commerce for Aeronautics, was sworn in as a member of the National Aeronautics Committee for Aeronautics.

Rene Schmidt Lawrence R. Richardson (ret.) and Joseph F. McDaniel were elected vice president of Cessna-Wright Corp. Richardson served last year as act. chief Bureau of Aeronautics.

Frank Cassin, Boston Cadillac salesman and Warner Corp. salesman, was appointed director of passenger for Cessna T. McDaniel was vice president of Cessna-Wright Corp. Richardson served last year as act. chief Bureau of Aeronautics.

Don Follis, Davidson-Burke (N.Y.) glider pilot, won Northwestern states wing championship at Flamingo N.Y. He flew French glider to collect \$400 in altitude and distance awards.

Walter C. Buchanan was appointed supervisor and act. assistant for Piper Aircraft Corp. He replaces W. T. Piper, Jr. who was named to his department duties.

Delta Air Lines and Air France have signed similar agreements covering routes between New York and Paris. The U.S. route served by Delta and 51 countries on five continents served by Air France.

John D. Cox, U.S. Coast and Geodetic Survey, was appointed CAA assistant to the administrator for unclassified aircraft. New post will maintain liaison between two agencies on aircraft matters.

### FINANCIAL

Delaware Aircraft Co. of Newark, Del. has increased its capitalization from 25,000 to 10,000 shares of class "A" and from 1,000 to 10,000 shares of class "B" stock.

Boeing Aircraft Co. reports net profit of \$64,130 for six months ended June 30 after \$78,000 tax refund. Sales were \$40,517,250 and backlog stands at \$218,757,717.

Northrup Aircraft, Inc., reports profit on fixed rate contract for 75 work item ending April at \$1,120,000. Backlog now stands at about \$22,000,000 largely for X-45 and YF-49 contracts.

North American Aviation, Inc., reports net income of \$220,947 for six months ended June 30 after \$4,300,500 in carryback credit.

### FOREIGN

Indian manufacturer Hindustan Aircraft Co. has been awarded a contract for 100 light aircraft for the Indian Air Force. The contract was awarded to Hindustan Aircraft Co. by the Indian Air Force.

Boeing Aircraft Co. has been awarded a contract for 100 light aircraft for the Indian Air Force. The contract was awarded to Boeing Aircraft Co. by the Indian Air Force.



## FOR BROACHES and for ALL Your Broaching Needs

## SEE American FIRST

You are sure of greater satisfaction when you buy American-made American. This is because American's broad experience in all phases of broaching—machines, tools, fixtures, and engineering. This all-around experience among you of broaching tools that will give accurately long life at low initial cost.

See American first for all types of broaches, surface, end, spline, iteration, bar, square, and formed broaches in any required size. American also manufactures pull and push heads for broaching tools of all sizes. And see American first for everything in broaching—machines, tools, fixtures, and engineering.



- (1) Grinding a spline broach. All American broaches are ground by skilled broach men to exceptionally close tolerances. (2) These broach broaches, and in addition, on 25 regular splines in steel, replace broaching gear teeth. (3) Broaches are 6" long and cut a spline version 1015" long by 41/2" 41/2" long shows broached version of part. American manufactures broaches of every size and variety, for the most working solutions. (4) This large broach, in a standard American 11-1/2" horizontal broaching machine, runs at moderate speed with a broach gear part. Size of broach is indicated by 1/2" scale shown with broached gear part placed in top of machine. (5) Checking a spline broach for

spline width in American's Trench Inspection Department. Every broach runs past and inspection before shipment.

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William Bernard and the Wetmore room in which he won the Gaudyana Trophy. (From *Asia*, photos unless otherwise credited)



Fred Morris having his P.H.D. after winning the Nordic Trophy race



Some of the extent to the Bendix test shown at Van Nuys, Cal., just before takeoff. (EN photo)

Tony Jensen, killed when his Cessna crashed during Thompson's flight last year.

Curtis Wright elects two vice-presidents, other personnel changes mentioned.

Alfred Masher, Roswell's president and chairman of the board of Republic Aviation Corp. has been elected president and gen. and manager of Aircraft Service Products Co. of Long Island City, N. Y.

Merchery relinquished the presidency of Republic and moved up to hotel chairman last December. He resigned as the Spring as ill health and returned to the industry only recently as a member of the board of Anash before Business.

In other personnel actions

A Carlin-Hicks Corp.-named branch of Murray and Levine is scheduled to provide security for the 1988 Democratic National Convention and the 1988 Republican National Convention. The company is a joint venture between Carlin-Hicks Corp. and Murray and Levine.

[illegible]

• **Archibald Alexander Corp.** announced the resignation of Roger Lewis, assistant, general manager. He had been with the company for 11 years. He has not disclosed his plans.

• **Henry Hargrove Co.** appointed Dr. W. L. Harvey chief engineer. He has been with Harvey since 1982 as director of research and development.

\* Carlton Wright, *Altophila* species, appeared in *St. Francis Xavier, Magazine* in Columbia, mentioning R. S. Fisher who suggested, Fisher served during the war as a Captain in the Navy and at sea there was heard of the possibility providing Vietnam on the Eastern of Indonesia.

★ **Glaxo's Frederic Cox** resigned the position of William F. Penning Jr. as senior and advertising manager. Cox was named as senior vice president, handling the general management of the entire division of American Corp., Oakland, Calif.

4 **Reproductive**—**Reproduction**: One-estrus period May to June. Males and females take part in courtship with females in estrus. Males and females take part in courtship with females in estrus. Males and females take part in courtship with females in estrus.

• **Grassroots Bleeding Co.** named B. C. Correll afloat in wake of the media and appropriate transportation options in protest. Ray Correll, who has raised river of drama with the company, Correll has been arrested several of the citizens.

\* Generalized Engineering Corp., Pasadena, Calif. advised Dr. Fred C. Lottman is the chief of research. He is president of the firm and was developing engineering at General Electric Institute of Technology.

Following joint rejection of a CIO-UAW contract with Ryan Aeronautical Co., a scheduled members' strike was cancelled upon report that the National Labor Relations Board would conduct a hearing to determine whether the union or international Arm of McDonnell should bargain for modern CIO-UAW's February demand for 27 1/2 cents per hour had been reduced to 15 cents.



Turbot action shot of a swim at surface over tailfin shows Marine Major Murren Cof stroking over Murren speed run at 650 mph. Shoot-up, low aspect ratio wings suggest high-speed design of the D-351 in this view. Two winged heads are used, one for pilot's airspeed indicator, other for winging equipment on research shell behind pilot. (New photo)



Closeup of D-553 with Conde Turner F. Caldwell, Jr., shows new heat-resistant material installed for speed record run replacing former plastic discs which melted during run from 170 deg. temperatures created by sound-breaking ejects. Also shown are six blind ports in duct center plate. The lower protruding high nose pressure jet for matched refrigeration unit, the center holes providing pressure pickup points for duct structure. Feedage drive motor may be seen on left face as is pressure manifold. (Over photo.)

[illegible]

Contract to fly 12,500 B-1 of four per hour from Pittsburgh to Kansas, India for the India government has been awarded to Willis Air Service, Watertown, N. J.

Contract covers fuel on the shipment, roughly 17,000 lb, through an American export organization, but arrangements were shifted to a British exporter who obtained a charter rate from BOAC.

Subsequently the load was reduced and the job awarded to Willis, which has a blanket contract with a Kansas shipper to provide certain cargo when shipping stops can be in need of relief.



## Jack & Heintz Sales Boost Yields Profits

A steady increase in game sales with a resultant profit in the first six months of the year, has been shown by Jack & Thomas Parsons Industries, Inc. in a strong comeback from previous difficulties.

Second quarter sales of \$6,717,719 easily doubled the total for the first three months, with fractional horsepower engines accounting for approximately 50 percent of the billings. Aircraft products produced about 15 percent of the revenue. No comparative data are available for the like period of 1996 as the former Jack & Jentsen, but was reorganized into the new company by a merger in March 1996. For the third quarter of 1996 sales were \$1,166,375 and for the fourth quarter, \$2,050,339.

With an average sales for year of \$10,418,358, \$611 realized an operating year of \$107,509. Nonrecurring income of \$724,850 pushed the net to \$1,652,218. Due to heavy losses last year, there are no taxes payable against this income. An unrecorded loss of about \$418,000 was sustained in the first quarter.

► **Profit Potential:** Company feels that the spread into new areas may be checked in the third quarter of this year due to a three week plant-wide shut-down for vacations. Despite this, the company does not feel it has retrieved its full profit-making potential. The six month report points out that "during this period savings were adversely affected by continued costs of reconstruction for postwar production development of new products, and preparation for production of such products."

As of Aug. 1, Mill had a backlog of unfilled orders amounting to approximately \$43,080,800. With the bonding of other firms willing to increase the number of employees to 4,100.



## KEY MARKER

Sample of the stimulus that will be printed along Shovel No. 1 between Los Angeles and Washington D.C., for the benefit of private pilots flying the route.

## INDUSTRY OBSERVER

► Navy and Glens L. Maize Co. plan an extensive test program with two F-4M's, long-range patrol bomber featuring combination of jet and piston engine power, already completed. Navy already has an order for seven more F-4M's. Funds for about 20 additional planes of this type were retained in final version of Navy's 1946 budget.

► Lockheed has completed 30 FIVs, long range twin engine patrol bomber of the Tri-Service Joint, built type, of an original order for 90. Navy has one FIV squadron in service on the Pacific coast and plans active participation of another for the Atlantic coast.

► ANF plans to equip its 14th fighter group at Dow field, Maine with Republic F-44 Thunderbolt fighters before the end of the year. ANF credits the F-44 with a 3,500 ft per min rate rate of climb.

► **Fruit & Whines** have sheels boosted their Wing major engine (rated at 3,750 hp to 4,000 hp) under test conditions and expect to get 5,000 hp. • Also 35 months (though schedule says 40) before engine effective service.

► Sperry Gyroscopic Corp., experimenting with acoustic control devices for Boeing B-29's. Seven C-54's of theAAF Air Weather Station are being equipped with Sperry A-12 auto pilots with automatic approach control units making possible automatic landings on the Sperry receiver landing system now installed for service testing at Anderson Field, Miamil, Wilmette, Ohio.

- **Glenn L. Martin Co.** has a Navy project for a post flying boat larger than the E-28 Sea King. The new boat will incorporate the new NAGA designed flying hull which permits multiple deck selections over conventional hulls.
- **ACA** is putting finishing touches on the first E-84 component for Teleflex, its radio telephone, all-weather fog and traffic control system. Final certification will be used for the new AAR, C-144, and the Government-developed, built, test of the new E-84, MA, the Air Force.

► Howard Hughes' high altitude plane plane, the XF-11, a doc at Meigs went for final flight today. Hughes' test pilot, Jack Williams, has put the XF-11 up to 30,000 ft without incident. He is scheduled to do five tests up to 40,000 ft and then place the plane at 10 percent lower for guidance of ANP pilots when they fly loaded acceptance tests that determine whether ANP will allow Hughes Aircraft Co. a push on the vertical

► Navy's latest jet fighters, the North American F-101, were badly damaged on route from Miami to the Naval Air Test Center at Patuxent, Md. The plane, piloted by Al Conover, averaged 486 mph. In the Miami-Orlando City leg of 1150 miles at cruise power. On take-off from Orlando City the tail pipe caught fire and badly damaged the plane before Conover could get it down.

► North American XF-88, swept-wing fighter was scheduled to undergo preliminary test flights at Muroc Army Air Base, Calif. but work on straight-line takeoffs and landings was not considered official test flights and they are used only for general longitudinal stability tests of the XF-88 "Yankee and all" behavior. Please closely resemble Navy XF-88 with addition of swept-wing profile. North American test pilot Al Comer believes the plane capable of speeds faster than its design 630 m.p.h. top speed.

[illegible]

► Douglas, Sharp and NRCRA engineers are studying the results of the DDTF model testing flights, which indicated the issue of compressibility in the nose inlet differs at a much smaller angle of  $\delta$  resulting in a sudden drop in intake speed.

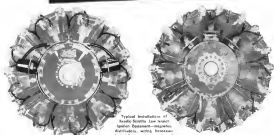
► Northey has again temporarily suspended its Feng Wang (B10) bomber test program due to propeller problems. The joint flying aircraft was grounded during some of last winter for the same reason. As a result only 28 hours of flight time have been possible during the past year during which 14 propeller failures were experienced. Six propellers are Government furnished equipment Northey devised to improve its test program until suitable alternatives are developed.

► The Douglas AD-4 Skyraider, now Navy attack plane, recently passed its career qualification tests aboard the coast guard Schooner.

*On Nearly Every Mile of Transport Flight...*

# BENDIX-SCINTILLA

## IGNITION EQUIPMENT



Typical installations of Radio-Scotch Low Voltage Ignition Equipment—magneto, distributor, wiring harness, electrical connectors and radio (shown as record and landing system).

Clean-cut superiority was won for Bendix-Scintilla® Ignition Equipment a place on virtually every commercial transport in use in America. Mile after mile, air-hour after hour has proven and reproven the quality of Bendix-Scintilla Ignition products—in use on every airline, and specified by every major engine manufacturer. Bendix-Scintilla builds both high-tension and low-tension aircraft ignition systems. The newly developed low-tension systems are designed for extra efficiency, especially at higher altitudes. Write for the new brochure, fully illustrating and describing the low-tension system with its outstanding features.

**Keywords:** *work, stress, coping, organizational commitment, organizational citizenship behavior*



Basilio Ballell's finished *Construcción* was built in a solid web of steel and bronze. Ballell designed it after a pressure-resistant steel pipe and its own welding techniques.



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*As Cerebrated Automatic Propulsion Unusual under Potentials of Broad Propeller City*  
 1844, 11, 1, 194, 195.

**76. SPERMATOPHYTES** **1890-1894** **Asplenium** **1895-1899** **Asplenium** **1900-1904** **Asplenium** **1905-1909** **Asplenium** **1910-1914** **Asplenium** **1915-1919** **Asplenium** **1920-1924** **Asplenium** **1925-1929** **Asplenium** **1930-1934** **Asplenium** **1935-1939** **Asplenium** **1940-1944** **Asplenium** **1945-1949** **Asplenium** **1950-1954** **Asplenium** **1955-1959** **Asplenium** **1960-1964** **Asplenium** **1965-1969** **Asplenium** **1970-1974** **Asplenium** **1975-1979** **Asplenium** **1980-1984** **Asplenium** **1985-1989** **Asplenium** **1990-1994** **Asplenium** **1995-1999** **Asplenium** **2000-2004** **Asplenium** **2005-2009** **Asplenium** **2010-2014** **Asplenium** **2015-2019** **Asplenium** **2020-2024** **Asplenium** **2025-2029** **Asplenium** **2030-2034** **Asplenium** **2035-2039** **Asplenium** **2040-2044** **Asplenium** **2045-2049** **Asplenium** **2050-2054** **Asplenium** **2055-2059** **Asplenium** **2060-2064** **Asplenium** **2065-2069** **Asplenium** **2070-2074** **Asplenium** **2075-2079** **Asplenium** **2080-2084** **Asplenium** **2085-2089** **Asplenium** **2090-2094** **Asplenium** **2095-2099** **Asplenium** **2100-2104** **Asplenium** **2105-2109** **Asplenium** **2110-2114** **Asplenium** **2115-2119** **Asplenium** **2120-2124** **Asplenium** **2125-2129** **Asplenium** **2130-2134** **Asplenium** **2135-2139** **Asplenium** **2140-2144** **Asplenium** **2145-2149** **Asplenium** **2150-2154** **Asplenium** **2155-2159** **Asplenium** **2160-2164** **Asplenium** **2165-2169** **Asplenium** **2170-2174** **Asplenium** **2175-2179** **Asplenium** **2180-2184** **Asplenium** **2185-2189** **Asplenium** **2190-2194** **Asplenium** **2195-2199** **Asplenium** **2200-2204** **Asplenium** **2205-2209** **Asplenium** **2210-2214** **Asplenium** **2215-2219** **Asplenium** **2220-2224** **Asplenium** **2225-2229** **Asplenium** **2230-2234** **Asplenium** **2235-2239** **Asplenium** **2240-2244** **Asplenium** **2245-2249** **Asplenium** **2250-2254** **Asplenium** **2255-2259** **Asplenium** **2260-2264** **Asplenium** **2265-2269** **Asplenium** **2270-2274** **Asplenium** **2275-2279** **Asplenium** **2280-2284** **Asplenium** **2285-2289** **Asplenium** **2290-2294** **Asplenium** **2295-2299** **Asplenium** **2300-2304** **Asplenium** **2305-2309** **Asplenium** **2310-2314** **Asplenium** **2315-2319** **Asplenium** **2320-2324** **Asplenium** **2325-2329** **Asplenium** **2330-2334** **Asplenium** **2335-2339** **Asplenium** **2340-2344** **Asplenium** **2345-2349** **Asplenium** **2350-2354** **Asplenium** **2355-2359** **Asplenium** **2360-2364** **Asplenium** **2365-2369** **Asplenium** **2370-2374** **Asplenium** **2375-2379** **Asplenium** **2380-2384** **Asplenium** **2385-2389** **Asplenium** **2390-2394** **Asplenium** **2395-2399** **Asplenium** **2400-2404** **Asplenium** **2405-2409** **Asplenium** **2410-2414** **Asplenium** **2415-2419** **Asplenium** **2420-2424** **Asplenium** **2425-2429** **Asplenium** **2430-2434** **Asplenium** **2435-2439** **Asplenium** **2440-2444** **Asplenium** **2445-2449** **Asplenium** **2450-2454** **Asplenium** **2455-2459** **Asplenium** **2460-2464** **Asplenium** **2465-2469** **Asplenium** **2470-2474** **Asplenium** **2475-2479** **Asplenium** **2480-2484** **Asplenium** **2485-2489** **Asplenium** **2490-2494** **Asplenium** **2495-2499** **Asplenium** **2500-2504** **Asplenium** **2505-2509** **Asplenium** **2510-2514** **Asplenium** **2515-2519** **Asplenium** **2520-2524** **Asplenium** **2525-2529** **Asplenium** **2530-2534** **Asplenium** **2535-2539** **Asplenium** **2540-2544** **Asplenium** **2545-2549** **Asplenium** **2550-2554** **Asplenium** **2555-2559** **Asplenium** **2560-2564** **Asplenium** **2565-2569** **Asplenium** **2570-2574** **Asplenium** **2575-2579** **Asplenium** **2580-2584** **Asplenium** **2585-2589** **Asplenium** **2590-2594** **Asplenium** **2595-2599** **Asplenium** **2600-2604** **Asplenium** **2605-2609** **Asplenium** **2610-2614** **Asplenium** **2615-2619** **Asplenium** **2620-2624** **Asplenium** **2625-2629** **Asplenium** **2630-2634** **Asplenium** **2635-2639** **Asplenium** **2640-2644** **Asplenium** **2645-2649** **Asplenium** **2650-2654** **Asplenium** **2655-2659** **Asplenium** **2660-2664** **Asplenium** **2665-2669** **Asplenium** **2670-2674** **Asplenium** **2675-2679** **Asplenium** **2680-2684** **Asplenium** **2685-2689** **Asplenium** **2690-2694** **Asplenium** **2695-2699** **Asplenium** **2700-2704** **Asplenium** **2705-2709** **Asplenium** **2710-2714** **Asplenium** **2715-2719** **Asplenium** **2720-2724** **Asplenium** **2725-2729** **Asplenium** **2730-2734** **Asplenium** **2735-2739** **Asplenium**

**FLORIANE HART OF CLINTON** quite modestly responds to having been chosen America's first lady for the 1992 election, then plans to spending most of her time in Washington, D.C.

**GREYHOUND GROUPS DENY AND**  
**APPEAL:** Arguments collectively  
 maintain the bus giant is up  
 against an impossible task of  
 rivaling an animal empire.

**SAFETY STANDARDS:** American Society of Safety Engineers (ASSE) and National Safety Council (NSC) standards are used to evaluate safety programs.

## ENGINEERING & PRODUCTION

## Production Plans Set For Beaver With Foreign Prospects Good

De Havilland's Canadian bush freighter completes first flight; high performance with load attracts interest abroad.

Having completed a successful test flight, the Crusader designed and built both engines. At Bedford Stove, will go into production shortly at the company's Dorchester plant with a rate of one a week.

While used principally at the local market of raising, oil and fire companies and charter operators in Canada's sparsely developed areas, the Beaver is specially built steel for load carrying and already in show say promise of becoming a factor in the transit field.

► **Foreign Interest**—De Havilland officials state that inquiries have been received from Scandinavian countries, from South Africa, Australia and South America. Distinctive features of the Beaver apparently make it appealing for use in high altitudes.

Meanwhile, the company is entered in the sale of 15 of the planes to the Ontario Provincial Air Force, a government facility and aircraft-lighting service, which has specified deliveries over a three-year period with 12 to be accepted by the end of 1990. The company expects tentative sales of 15 additional planes.

The Flower, the second postwar Cassa design, was designed to come from the same threshold plant. The first was the all-metal Chrysler transporter, an all-metal single-engine high-wing monoplane that can be equipped with wheels, floats or skis. It can be used as a light transport carrying five passengers plus pilot, or as a fighter with all sorts of armament. The whole is built in aluminum.

■ **Quick Take-Off:** It was constructed with the emphasis on high rate of climb (1,280 fpm at sea level at 1,600 lb gross weight) and quick take-off (515 ft at sea level, zero wind and 40 degree flap) to accommodate operations from small lakes and primitive landing areas.

Span of the Beaver is 45 ft., and length (hatchback) 30 ft. Length of scapula versus is 32 ft. Outside fuselage width is 52 in. Fuel capacity is 50 gal. Bibo model 4113 all-metal floats are standard on the scapula. Fronsco is made up one of the floats for conversion to 100 gal. capacity.

In passenger version, the Bowser has space for baggage storage on each side of the single seat unit. A large separate compartment opens to the rear of the cabin for emergency back kit, emergency oxygen, etc. The

rough ends are easily accessible and the other has a reinforced base. Place under the accessible end next to the pilot is on the same level as the balance of the tubes so that long cargo runs will be flat.

There are four doors on the hallway, two on each side for the pilot's and freight compartments. The main rear door (or hatch) is flush with the floor. Stairs are provided in the rear wall of the other end, outside of the hallway to enable easy access to the hatch. Each of the 10  $\times$  10 ft. diamond ducts to be heated and shrouded. Green or

pacity of the rifles is 104 cm (41 in).

Gas tanks are installed under the engine floor, thus eliminating any need to climb on the wing to refuel. Fuel nozzles are positioned on the port side and can be scooped from the ground or while standing on floats, which also allows ground crew to see fuel refueling gauge while refueling.

Specifications for the Beaver with Push & Whimper Wing Juntas 410 hp engine allow a maximum speed for the landplane of 160 mph and 145 mph for the amphibious version. Cruising speed is 130 mph for land plane, 127 mph for amphibian at sea level, slightly higher at 5,000 feet. Maximum ceiling is 30,500 feet for landplane, 18,000 feet for amphibian.

The Beaver can carry 4 or 5 passengers and baggage on a single load of just over a half ton. Versatility of point's cabin has been increased by forming the wing root.

The Brewer is priced at \$15,000 with both wheel and foot landing gear.



The Harrell-Hunter Review on April 2004



Venatility of de Havilland Biorex is well noted in this interior drawing. Wide cargo doors admit a standard stretcher, which is fastened to the floor, leaving ample room

for testing these passages. As an all-passage plant, the flower carries five seeds, positioned to permit maximum amount of contact in the 144 cm. diameter.



Curtis-Wright CW12 low-engine cargo truck as now being shown prospective customers at the airplane plant in Columbus, Ohio

## C-W Shows Cargo Plane Mock-up

Company claims craft can handle any cargo now going by rail.

While completing and showing a mock-up of the proposed low-engine cargo plane, CW12, at its Columbus airplane plant, Curtiss-Wright Corp. is adopting production plans with definite commitments can be obtained.

Prototype, originally scheduled to be flying sometime next year, will not be built immediately. A further change in the company's plans for the 100,000 lb plane is the substitution of 2,100 hp Pratt Whiteley R-2000 engines for the 1,515 hp R-1675 Wrights listed in the specification when the plane was announced last November.

The change was made both to obtain more power for the plane in view of raising the gross from 80,000 lb, and to conform to suggestions of prospective buyers. Military Interest—Two cargo versions, Rock and Sleds Pl, are understood to be studying the CW12, and an ANP contract for a limited number is still a possibility. ANP officials went over the mock-up this morning.

If orders are forthcoming, C-W states it could build the first airplane in 12 months. The CW12 is one of the few airplane plans designed specifically and solely for cargo carrying. An innovation in loading arrangements is achieved by providing for the entire tail section of the airplane to swing up, exposing the full interior of the cargo hold. A heavy fold gate at a 74-in. track can be driven closed.

Roll Competition—Cargo hold can accommodate a shipment weighing up to 11,000 lb and measuring 40 ft long by 9 ft wide and 7 ft high. Overall length of the cargo

hold is 61 ft, and capacity is 4,000 cu ft. The company claims the CW12 can handle practically any type of cargo that one can get by rail.

In addition to the cargo entrance afforded by the hinged tail section, the plane has large cargo doors on either side of the fuselage, placed at truck-bed height. Because of the plane's high-wing design, a truck can back up to the side and discharge its cargo directly into the hold. Curtiss-Wright claims the plane can carry a ton of cargo from New York to San Francisco at a direct freight cost of \$112.



202 READY FOR AIRLINES

Columbia says that three runs of derivation, design, manufacturing and also testing, Glenn L. Martin Co. officials in the SAC to the 202 airplane that recently completed the first experimental series test after CAA granted its approval type certificate (Aircraft News, Nov. 17). O. E. Pratt, Martin's flight director who conducted the 202 tests, handles the speed gun in working order. Left to right: George Trumble, Jr., chief of arrangements; M. E. Gayton, CAA flight safety; Don E. Cummings and Stanley C. Cook, right test engineer; and F. O. Fennell, superintendent of airport.

## Kelthman Announces Tachometer-Recorder

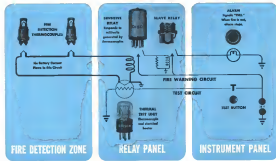
Enabling a combination tachometer and tachometer recorder, constant revolution per minute, measures the speed for logging a separate engine log for maintenance overhaul. Kelthman Instrument Division of Sperry D Co., 30 65 41 Ave., Elmhurst, N. Y., makes the lightweight device, which is designed specifically for use in small aircraft.

The instrument provides a continuous reflection of engine hours based on an average rotating speed of 2,000 r.p.m. Hours are recorded on a dialer unit when the engine is idling and soon rapidly when the engine is operated at higher speeds. The instrument operates on either electric or counter-electric drive.

Kelthman claims that Tachometer has no adverse effect on the compass, even when the Tachometer and compass are installed side by side.

## Former Bell Plant Sold

Four large buildings and 65 acres of the original Bell Aircraft Corp. property at Niagara Falls have been purchased from the War Assets Administration by the Carborundum Co. for \$1,000,000. The land and buildings are part of the plant, formerly occupied by Bell but released by the War Rel. May is not required in its future program.



Here's why the EDISON aircraft fire detection system is

**FAST • SAFE • DEPENDABLE**

- **FAST**—will respond to flame almost instantaneously, regardless of ambient temperature.
- **SAFE**—the fire detection circuits carry no battery current at any time—require no air-tight seals—have no moving contacts in arc. Any dangerously rapid rise in temperature causes the detector thermocouples to generate their own e.m.f. (measured in millivolts) which actuates a sensitive relay located outside the fire detection zone.
- **DEPENDABLE**—absence of moving contacts in the fire detection circuit eliminates a possibility of false alarm due to vibration. When a fire is out and conditions return to normal, the detectors signal "FIRE OUT" and are again ready to signal "FIRE" rapidly and reliably, without need for replacement, recalibration, or manual reset.

test. The entire system can be tested at any time merely by pressing a button.

The Edison Aircraft Fire Detection System is used by all scheduled airlines in the United States. It does not false alarm when properly installed because thermocouple detectors signal "FIRE" only when there is a DANGEROUSLY rapid rise above normal operating temperature. The Edison Fire Detection System is rugged, simple; it takes no fire hazard, and has no moving parts in the fire zones. Both wiring and operation can be checked with the push of a button.

Write for descriptive literature an design and operation. Address Instrument Division, Thomas A. Edison, Incorporated, 120 Lakeside Avenue, West Orange, New Jersey.



**EDISON** Aircraft Systems and Instrumentation

Thomas A. Edison, Incorporated, Instrument Division, 120 Lakeside Ave., West Orange, N. J.

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FAST, ECONOMICAL FABRICATION OF  
STAINLESS STEEL FOOD CONTAINERS



Container has a heating coil and a cap to do for. Easy-Flo is made of 18% or 19% nickel. Easy-Flo is made of 18% or 19% nickel. Easy-Flo is made of 18% or 19% nickel. Easy-Flo is made of 18% or 19% nickel.



EASY-FLO based stainless steel food containers are used in most airlines. These units in a row of three in the galley of a Douglas DC-4.

These containers—which keep liquid foods hot or cold—are used in the galleys of airliners. Like so many other modern products, they are made principally of stampings all brazed with EASY-FLO. Like so many other manufacturers, their maker—Harrington Air Service, Inc., Mansfield, Ohio—has found the answer to fast, economical production in EASY-FLO brazing. It's the answer, because the silver brazing alloy EASY-FLO, with its low working temperature, exceptional fluidity and fast, deep penetrating action, reliably joins stainless steel stampings with all the strength and leak-tightness of the unjoined metal. It's the time and labor-saving way to join ferrous, non-ferrous and dissimilar metals.

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## Rough Water Operational Tests Conducted by Navy

Latest version of SC-2 has successfully completed last and toughest of acceptance tests—under the worst possible conditions.



SPRAY OBSCURES view on take off to 15 mph wind.



INTERNAL IMPACT—Navy Scout lands in 5 ft. waves.

Latest version of Navy's SC-2 Corsair biplane has successfully completed the last and toughest of acceptance tests—rough water landings and take-offs under just about the worst possible conditions imaginable.

What happens when a 7,600-lb. airplane becomes involved with five-foot waves and wind velocities up to 15 mph is shown in the above series of pictures, taken during the most tests that were run in Chesapeake Bay off the Naval Air Test Center at Patuxent, Md. At times the plane was completely covered with spray, at others, the entire wing tip would be under water. No serious damage was reported.

► Navy Ratings—The official Navy report on

the tests goes the Corps pilot, Wright engine and Ede. Both satisfactory results on the battery performance.

Navy's rough water tests were a two-fold purpose. They determine whether the plane under study can be operated in rough water, and then also learn the limits of its performance, within those limits, one by one, down operational rules for one of airplane off landings and take-offs.

► Weather Limits—For instance, in the case of the SC-2, the results of the Patuxent trials indicate to suggest at days off which the plane will be required that a 15 mph wind and five-foot waves may be the limit of bad weather conditions that the particular plane

can operate as well as expected to survive.

Such conditions call for the element in both pilots and airplane. Scenarios gradually are added on to the water in landing. If the pilot is faced with waves striking a height of 5 ft., he might estimate he is still 4 ft. above a headover when actually, considering the height of the waves, he is only 4 ft. above the water. The resulting shock, when the wave hits, is considerable. It will usually bounce the plane into the air. Tearing and twisting present when gusts, moreover, no standard procedure most of the time as to whether those maneuvers in the rough of the water. Waves normally run at right angles to the wind.

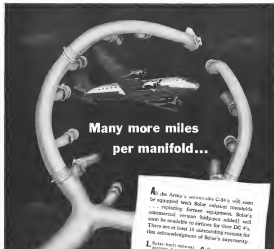
WINDTIP SUBMERGED but no damage reported.



CROSSWIND testing in troughs of heavy seas.







Many more miles  
per manifold...

All the Army's new vehicles (C-34's) will soon be equipped with Solar exhaust manifolds... replacing former equipment. Solar's commercial version (out-pipe added) will soon be available to airlines for their DC 4's. There are at least 10 outstanding requests for this acknowledgment of Solar's superiority.

1. Solar-built exhaust systems have three moving parts - none on the C-34's (1 per engine on the DC-4).
2. Longer life and lower maintenance cost.
3. Only 7 airlines are considering it in exhaust ports.
4. Maximum of 3 Solar exhaust ports per engine.
5. The three parts are replaced as high velocity, excessive drop-out of the airplane.
6. Smooth joint for low-weight exhaust ball joint.
7. Manipulation of only 10 parts for complete maintenance per airplane.
8. All systems (except Solar) are subject to the 4 engines.
9. Weight only on the 10 per engine (including manifold weight).
10. A decreased heat and reduced leakage keep engine cool.

For complete engineering details write or call Solar - size tables of component parts for jet-engine vehicles and ground vehicles.

**SOLAR**

**Aircraft Company**

Two Wings, 10, East, • One Million, 1, Seven • 123 Hudson River Building, Division 1, 4th Fl. • 40 E. 42nd St., New York 17, N. Y.

shortage of design could be quickly determined, showing vehicle exhausts for substituting cost of similar specific items, within the week for day and at present today's requirements involved in normal production activities.

► **Engineering/Production Coordination.** For the single X24-4 project, selected as governing personnel spent time was 137 (from Martin's) staff was saved from their usual segregated queues directly to the production floor. Also attributed to the technique was a separate accounting article for maintenance of the records was but a few hundred feet from the project area. A special raw stores department was set up and material brought in via plane and truck from distant points, thus cutting seven weeks from time required for second ordering schedule.

Detail design was not released until it was ascertained that material for parts were available, and that parts were fabricated within one week after detail engineering. Design was released. Tracking of details released was not allowed to exceed 4,000 (34,000 estimated total number for the craft) to insure efficient coordination between engineering, shop, and assembly, with engineering maintaining a work load on production.

Forward working through engineering, procurement and production was frequently discussed. With a single detail for a type cut part, the engineer would go to the assembly shop and discuss laborious details with the machine, work commencing at most at once if no additional tooling was required. If special tooling was needed, details were worked out immediately by on-going mechanics, and tool designs, the tool during being noted directly to the shop for fabrication. When the part was finished it was taken to assembly for installation, or to design and model.

Weekly meetings between heads of engineering, production, tooling, manufacturing, and planning considered current and anticipated problems. And through the close coordination, special tooling and fixtures were discussed whenever possible, acceptable substitute materials were selected, short-cut methods worked out, and additional personnel assigned to eliminate bottlenecks.

How are some of the manufacturing detail efforts—methods adopted at Martin to solve problems that usually confront the aircraft manufacturer in normal production schedule?

► **Manhole Utilization.**—There is a normal production difficulty when the reaction pump mechanism try to install equipment mounted on cramped quarters. To avoid this time-consuming condition, due to eliminate waiting for completion of the aircraft structure a full scale wood model of tubes and forward wheel was constructed, since these were particularly equipment-mounted items.

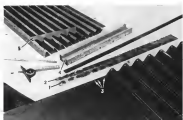
This gave pump engineers an opportunity to have numerous studies of various reactions performed and fitted to the exact area



Conty wing lower fuselage. Butt joints of individual corrugation sections were staggered to use staggered on 12 ft. basic unit splice points 15 ft. apart. Details are: (1) Masonite aluminum head, (2) side sheet, (3) spot sheets, (4) corrugation sections, and (5) clamps for holding parts in contact heads.

working under conditions simulating actual installation in the finished craft. Thus, when the craft structure had progressed sufficiently to receive equipment, the machinery installations were covered and

transferred directly to the airplane. Equipment was installed on the modeling included electric wiring hydraulic and pneumatic tubing (aluminum with heads and unions), fuel lines, linkage for light and engine con-



Typical corrugated sheet is formed by the hot-rolled pipe method on pipe linder, for second X24-4 project. Staggered development of corrugation of each bend sheet is laid out on template, bend being staggered from engineering drawing of complete corrugated sheet. Holes in hot-rolled pipe are laid out on each section combine, those on one edge of template for radius spacing of corrugated sheet around end (1) and on other edge (2) for outward end. Template is placed on hot sheet and holes drilled distance between centers approximately 4 in., greater than finished length of sheet. First in hole V-bite are spaced to accommodate drilling, and clearance holes for pins are drilled in patch. Sheet is then placed in hole with hole (1) located on pin in the far end bend. Two bends are made each time sheet is turned over. If the sheet end held hole in block some (1), another template (2) is used to check punch, depth, and angle. Sheets are then moved to finished length, reworking holes used in forming.



Center ring box, with center board for loading leading and trailing edges. - Strake frames are at (1), top; raised star dummy at (2).

tely, the control mechanisms, valve control mechanism details and actu. Wood models were used for valve visualization, and wing, tail tips, wing, and then others to have actual during construction. From microfilm, these such as map case, fuel and air, and the main battle was installed. Parts of component construction, new layout only, and in addition to take into the design method, modeling was assumed on the production line.

► Wing Construction—Division of the wing required and high wing loading required, double top and bottom skin were employed underlying supported corrugated ribbing (spine) in pitch (spine) and in depth (ribbing).

Based on the normal procedure for obtaining these corrugated sections, having dual lead and ducts located to represent leading and trailing edges that would have defined the project at least in model.

The 10th, built in the plant couldn't be used for these reasons because it wasn't sufficiently long to illustrate the short gap between spine sections. Since the short gap couldn't be placed together, the ribs were of solid weight and stress factors. The 10th built originally for constructing the corrugated sheet was to lap and seal successive angle corrugated sections (spine) and connect in gaps from end to tip. Though this involved the weight penalty of metal corrugated ribs, the gain was considered a safe trade-off since even when the project was in the final, one-point stage.

For the second 300-45 project, new model was, a hole of selected length was obtained to illustrate small corrugated sheets. These parts are determined by leading holes in sheet metal development on the flat sheet. Secondary boards are made first on one side

of the sheet, then on the other, over the whole sheet width.

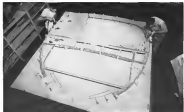
Instead of using wing skin with panel construction, the main section in corrugated sheets, both inner and outer coverings were installed on the flat sheet. One side of the sheet was then applied to the panel-in form 181 to 125, from 125 to 90. This afforded considerable weight saving and compensated for part of the all-around weight involved in overlap and riveting of corrugated sections.

Clear tolerances required on the actual center, detailed design, from model

method of building the assembly, as in the standard construction of different parts. The entire process was simplified into standard and leading position.

Vertical fixtures were created with standard lead-in to control the center. Wing components were then applied to this center—main skin, spine, plates, corrugated (ribbing) sections, top chord, inner skin, and outer skin, then wings.

During this assembly, spine plates, corrugated ribs, and outer skin were drilled through holes, channels, and rivets. Spine chords were drilled and temporarily sealed.



Extensive testing was needed and two used by using actual center line left for assembly of inner, leading, ribs, etc. Last was located in flat table, and handwork Model for leading chords and other details were located along main axis at station for particular assembly. As assembly was completed, other blades were placed at another station for different assembly. This single table could be used for many different assemblies, mostly by changing blades. Engineering used work time by eliminating detailed leading, simply representing center lines left with drawings (usually line hand) of assembly.

# INTERCHANGEABILITY



Illustration of an actuator valve, showing the valve body, the actuator, and the valve handle. The actuator is a small, cylindrical component that fits into the valve body. The valve handle is a lever that can be moved to open or close the valve.

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This tank, together with electrical controls, was built and in operation within 24 hr. after drawings were made to facilitate loading of gas tanks by fast loading of oil tank.

Inner skin was applied, drilled through con-  
sistent lower costs, and later cleaned  
heat sink was then removed, gas tank  
permanently bolted with flush-head nuts,  
and gas tank applied with final costs.  
After with three angles were bolted through  
inner skin, gas tank, and outer skin.  
This lower blanket assembly was then re-  
moved from the vertical furnace and placed  
in Mueser's benches of horizontal furnace.  
After with were then placed between three  
angles and drilled and drilled in position.  
Wing ribs were attached between upper and  
lower blanket, without upper ribs directly in  
place. Upper blanket was lowered on to  
gas tank and upper conical heads tied to  
lower benches to hold blanket firmly. Holes  
were then drilled through upper ribs for  
bolted attachment of upper blanket close  
angles. Upper ribs of ribs were bolted and  
fastened to upper blanket and ribs.  
(Also had removable ribs for work in some  
position of wing box.)

► **Short-Cuts.** To avoid delay of many  
months involved in outside fabrication of  
gas and fuel tank bulkhead shells, Mueser  
bought his stock and obtained this com-  
pany. This was considered an advance  
technique method for single-unit production,  
and cost compared favorably with that for  
outside procurement, considering expense of  
special dies and extensive order quantities.

To facilitate forming of fuel tank cross  
over center wing, a tool as the form of a  
dummy wing section was built for use in  
fuel tank frame. The model wing and  
several wing center sections was made for as-  
sembly to fuel tank. Dummy wing section  
also served to locate wing to fuel tank  
rig fitting. In addition to this, a  
dummy wing center section was made for as-  
sembly to fuel tank.

In another instance, a dummy was formed  
to obtain contour of lower fuselage due to  
between power plants. After this was formed,  
dummy was further attached in part of the  
fuselage to build up the nacelle and nacelle  
also assembled.

More difficulties which might have  
occurred delay was also anticipated. This  
indication of fuel tank section used in the  
wing were pre-checked in a simple pilot plate  
resulting in the final installation, to assure  
that these were made not possible.

Difficult drilling of important dimension  
and holes through the shell, these angles,  
composites, and this at the second 325-48  
wing assembly has been completed by adopt-  
ing a drill press to the project. With the  
wing in horizontal position, the drill press  
is repositioned on table (if found) and  
supported by the wing section benches, so  
that the drill is always normal to the surface.  
► **Full Cell Installation.** As an interesting de-  
sign feature in itself is the structure arrang-



Wing joint on light balancing units  
mounted bulkhead of nacelle is closed  
assembly during testing, taking, and landing.  
Cells in full-outgoing, aircraft rate allow  
lay. Small door is attached to start, and  
larger door (from upper of end) is closed  
except during gas extension or retraction.  
Main gas suspension two tandem-type  
double-bolt units attaching into fuselage.

ment permitting rapid removal of the right  
fuel cells. Four of these units are first  
found to run from the bench top, also, two  
cells are located one behind the other, as  
well as wing, between nacelle and nacelle.  
Each end of the fuselage into a com-  
plete line to permit withdrawal through bench  
top.

The two outer fuselage cells are driven  
through removable bulkhead, so that such  
can be drawn into an end cell area, then  
down through bench top. Wing tanks are  
pulled inboard through removable ribs, down  
through opening in lower wing, and through  
bench top.

## Escape Method Developed For Douglas D-558 Skystreak

Free fall of nose section to carry pilot safely out of  
transonic speed ranges prior to bailout.

By B. C. DONOVAN, Project Engineer, Douglas Aircraft Co.



Douglas Skystreak in flight



Diagram shows position piloted and position of release controls.



Nose section detached, this portion falls free.

Sales, personnel, as transonic velocities increase, for the pilot of the D-558 Skystreak in case of extreme emergency entered discussions early in 1945 between the Navy Bureau of Aeronautics, NACA and Douglas engineers.

While no difficulties were expected in pilot egress at subsonic speeds, as the normal cockpit bailout method used in aircraft was to be employed, numerous ideas were discussed concerning transonic safety out for the pilot. It was evident that thrust falling out into the transonic area would be undesirable.

► **Escape Device.** The most logical solution seemed to be release by the pilot of a nose able mechanism which would fall free and slow down to a speed that would enable pilot time to bail out.

Consideration was given to slowing the nose component during its free fall by parachute or decelerators. Both were discarded due to structural difficulties in the use of decelerators and because a suitable chute that would successfully open at high speeds was not available. Another method, in which only minor considerations were given, was that of having pilot and seat assembly attached to rear portion of fuselage after nose was jettisoned, because of danger of possible nose collapse and the fact that recovery of plane would probably result in its abrupt stoppage at the moment of e.g. change. This suggestion was discarded.

Development of present method indicated that nose component would probably slow down to about 500 mph without any decelerating device, and that it would be safer factors in test and in flight, once main structure was released at moment of egress.

► **Design Details.** Design finally chosen evolved into a mechanism featuring all pilot's compartment in remainder of time lag is, name of free-fall type looks. These were designed to operate mechanically by a pull handle located above center of pilot's seat. A 60 lb pull on handle completes, concurrently, a two-second decompression of the pressurized cockpit and release of bomb-bait handle. The two-second decompression is deemed sufficient to preclude serious effects of an "explosive" decompression in releasing the nose section.

Once clear of the plane, and with falling speed sufficiently reduced, the pilot bails out by pulling a cable handle located against right sidewall of cockpit approximately at hip location. A 30 lb pull on the handle releases nose section, which is broken and characterizes forward movement, allowing him to clear or fall out of rear of cockpit.

Should speed of airplane be below that allowing a nose-bailout escape, pilot can return handle enough action by a 20 lb pull on cable handle to slow down on right side of cockpit near knee level.

An overall problem was presented in the requirement of a quick decompression system for emergency landing from nose section into after airplane structure—both under controls and engine controls.

It was deemed impractical to attempt to

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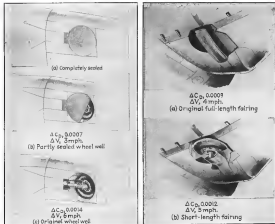
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## Searching Drag Studies Check Speed Impeders

Outlined are investigations of three landing gear installations — detailing effects of full and partial sealing of wheel well, and sealing of fairing edges.

Part V



High drag of installation at upper left and when separation of sealed type wheel well. Complete sealing of well decreased drag coefficient by 0.0004, and partial sealing decreased coefficient by 0.0007.

Partly open wheel wells on the left (left) accounted for drag coefficient increment of 0.0005—amount when cover plates were removed from exposed sides.

Removal of such loose edges of original full-length fairing (upper right) even reduced landing gear on this plane increased drag coefficient by 0.0003—indicating that air was leaking through its cracks at these points. Short-length fairing (indicated for production craft) increased drag coefficient 0.0002 over that measured for completely sealed fairing. This drag results from both air leakage and surface disturbance by exposed parts. Data show importance not only of installing fairing over wheel but also of completely sealing wheel well opening.



Upper photo of newspaper firm, Portland, April 5, 1967. Courtesy Oregon Journal

## This press car gets there first



To the helicopter the time is no problem, nor crowds, nor tough terrain. The reporter gets the news faster. The photographer shoots a pictorial record that's at home on the front page.

Portland's wide-open in Oregon Journal has owned a Bell Helicopter since last spring—"primarily to enable the news room to cover the state with more speed and accuracy." For the Gazette paper in the East, as for the Journal, Bell Helicopters are handling spot news faster.

Bell states Bell Helicopters are making news for the Los Angeles Herald and Examiner and for the New York Journal-American. They have visited ships at sea... witnessed foreign dignitaries... followed parades... even delivered a laundry queen to the judges' stand. Even publisher William Randolph Hearst, Jr. "Review of his flying technique you can't beat it on short-notice news and photo jobs."

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## PRODUCT

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AVIATION WEEK, September 8, 1947

### Machine Tests Aircraft Design

Unit is first heater used in making an ash in an production at Curry Hydroelectric, Inc., 914 11th St., Hamilton, N. Y., and first one has been delivered to American Airlines. Disrupted Model JH1, machine employs two compression pumps, four manometers, a flow-flow control, two fuel gas



## Spreads Shading of Texts

Double-charge tracing valves, designed to enable quick applications of two different fluids on the same run, are being applied in various aviation industry, as well as commercial market. Special stainless-steel chemical pump up lines from Inco. Miles, **Coated** Mfg. Co., E. 15th St. at Calhoun Ave., Cleveland 10, when this valve in two types—"Regular" for bearings to be repackaged by contact greasing, **disposable**, **Coated**, or **anti-leak** methods, and "Q-8" for repackaging by **air**, **vacuum**, or **hydrostatic**.

### Information Tips

### Move Ahead Transparent Plastic

[illegible]

#### Metallurgical Equipment Described

Wind velocity and wind direction instruments made by W. & L. E. Hughes, Inc., W. L., are preferred and described in new 12 page Bulletin 1011 issued by company. Meteorological cases covered in this Bulletin are U.S. atmospheric, high capacity, surface and sea, and A.C. type wind direction instruments, the gage's recorder, and the balloon float. Indicated are modifications for independent remote station, sea, and indicators.

AVIATION WEEK, September 8, 1947

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ENGINEERING PRODUCTION

## AVIATION SALES & SERVICE

### Two Eastern Aircraft Operators Get Goodyear Amphibians On Loan

Atlantic Aviation and Northeast Aviation selected to receive first of 10 planes placed for unique service test to determine market potential.

By ALEXANDER McSIBRELY

First two of 10 Goodyear amphibians which are to be loaned to aircraft operators are being placed with Atlantic Aviation Corp., Teterboro, N. J., and Northeast Aviation Co., Perkasie, Pa., while the other eight planes in the unique service test program will be loaned to other operators in the Midwestern, South and West Coast areas.

Meanwhile, Goodyear Aircraft Corp., Akron, Ohio, will operate five additional GA-2 planes to make additional service performance data. First technicians of the service test reports, plus additional production cost studies probably will determine whether Goodyear will enter a national market for the amphibians in the personal plane market when the market begins its expected upswing, as the plane becomes popular.

Nine of the planes were sold on the way to completion, and the remainder were sold along the way in the assembly line when the seller wanted the plane first work so that the limited present production program for the GA-2 is a steady stream of completion.

Incidentally, one of the planes is the GA-2 that will ever be made. But it is a machine of operators and passengers compared to the amphibious machine the plane has had that far, and it carries radiators a removable market at the price which the plane must require. Goodyear eventually may produce for sale a modified version of the GA-2. It could be a four-place, depending on how Goodyear engineers can solve the problem of retracting the plane's main wheels. Now they look up into the bulk on the sides of the fuselage, so that the wings retract the width of the rear seat to one passenger. Another possibility would be to use an extension shaft from the propeller mounted step the wing, ahead of the tailing edge, down to the engine, located in the fuselage. But Ed Bern, Goodyear engineer in charge of the "Duck" development, likes the safety factor of the propeller's present position, so that it will probably remain where it is, out of the way of even the most careless pilots and passengers regardless of the type of engine installation.

Principle critics, and there is only one, is that the plane is too noisy, an inherent fault of propellers, and needs attention to sound insulation. The amphibian's design goes back to J. Byron Jones, former Goodyear engineer, who designed the original GA-2, and was generally well liked in the design of the experimental amphibious amphibians which were once a Topco project. Bern, former director of engineering for Aerojet, took over the Duck project when Jones left Goodyear, and has retained the original plane's soundness, and maintained the power, although the GA-2 still retains the basic dimensions and design features of the GA-1 (Wing speed 35 ft., length 28

ft., height 9 ft. 4 in., all-metal construction except fabric wing cover).

Of unusually sturdy construction, compared to most contemporary light planes of its size and gross class (245 hp) the GA-2 weighs 1,450 lbs. empty. Has a gross weight of 2,200 lbs., and the wing loading is correspondingly high for a light plane, 12.5 lbs./sq. ft. The plane is reported around the use of engines as high as 185 hp. It seems indicated that if Goodyear elects to produce a smaller plane, in quantity, it will be lightened considerably, and the rather orthodox construction design of built hull and wing will be simplified to take advantage of new production design advantages.

However, the airplane is now outstanding in performance for a small amphibian. It cruises at a respectable 118 mph at 50 percent power, has a top speed of 135 mph and a 640 ft. (197 m) rate of climb. Range fully loaded is reported 160 miles, and it lands around 35 mph. Goodyear does not want to disclose the full production characteristics. Up to date, Goodyear pilots have put approximately 500 flight hours on the GA-2s, with the bulk of the flying being done by Chapman. As a result of his flight



A-26 GO CIVILIAN

Interior of five-place cabin installed in former combat type of Douglas A-26 attack craft—one of two with planes in conversion program at Lockheed Aircraft Service's Richmond base. With seating room extending 900 mph, and wings of 2,300 sq. ft., amphibious business model will be latest monocoque-type plane. Seen in all three and interlocking fuselage box. Included are soundproofing, controlled heating and ventilation, fueling, washbasin, and toilet. These craft have been completed and fourth in its program for Superior Oil Co. With a long conversion for Standard Oil & Gas Co.

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● To make flying safer by company computers, other passengers and crew members, Standard Oil Company (New Jersey) has equipped its new Douglas DC-8s with two Careson-Bell Aircraft Clinics. Located at the rear of the company airplane in Berkeley and Lombard streets with their state-of-the-art The Standard Oil Company (New Jersey) and many other passengers plane models, these Air Clinics serve the same purpose as on-call or in-flight or on the ground. These planes are now, along the obvious, available by equipping these clinics with Careson-Bell Aircraft Clinics.

features of the new Douglas DC-3 owned by Buckle Oil Company (Buck Oil) showing the four Constant-Speed Gear/Drive assemblies. A drive is fixed in both shafts of each unit, combines heavy, continuous and constant — is not worn normally but is positively available in an emergency. Write to Lewis & Clark for complete details.



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with the proven, powerful, effective, strong, stable



**IRVING AIR CHUTE CO., INC.**

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[illegible]

With its emphasis on getting its whole industrial base of the country, by independent agencies who are not connected with Goodson's test pilot unit, Chapman is confident that the planes will get a much more serious review stage, comparable to that which they would receive if they were being sold to all comers. The reports will be included in *News* and any experience of trouble in any part of the airplane, calculated by reports, will be watched carefully for the possibility of relegating the airplane to second class. The end result, Chapman believes, will be an airplane which will be as much trouble-free.

[illegible]

**BONGMANG SUKJAEUNG TANG:** A third son, last offspring has the name *Plum Blossom* because it is created by a new 30 gird (sash) that has this meaning. This offspring is prepared to lead a peaceful engagement in the future (reconciliation). But Bongmang, which is the first son, is a peaceful engagement. The first son is the company-owned Bongmang, which is the first. For the subsequent child who will have a full complement of line present in the place, the inheritance part, the place apparently will be more more or less that he can use a lengthy flight, at least partly an amusement and will have enough creative lead to be a leader building. The 120 lbs extra weight of the last has the biggest allowance in the engagement, but the tank will comprise only a small part of the engagement, so that three strands of line are seen, at the end of the line, a good example.

WHERE THE PROGRAM ENDS—Two qualified observers of the past personnel violation process say that only the full-time training program is keeping state courts on track. They are leery that the docking of light training in the winter months will cause a relapse into the old ways. "The courts are not going to be perfect, unless some unexpected upset happens. There will be too few trainers, the operators who are still turning in bonuses to come in there and who aren't out 'beating the bushes' for any possible new business, and the operators who haven't developed in the past," says the former state court administrator. Next is the question of the two assistants. On a basis of recent field trip observations, the operators who are full-time and devote for Sessions Burch and Clappa, precisely speaking, appear to be more attentive in sales efforts, and as a result in better position to take out the check personal paper market sector, than do many of the operators appearing other companies. The observers

**EXTENSIVE ECONOMIES**—An aircraft operator who provides lake services by flying in order necessary spare parts in advance of actual needs and who then has to fly a plane to the nearest distributor to get a part to keep the damaged equipment on the ground until the part can be shipped on order or adding in their own operating cost by such methods. The buying of stocks on equipment which makes it possible to anticipate part failures and replace them in advance and ordering replacement parts well in advance of actual needs are two sound business practices which every successful airline transportation operator follows as a matter of course. The men who operate airplanes would be more successful if they would do likewise.

**FIRESTONE NOSE LEAF**—Firestone Aircraft Corp. has an overriding nose wheel landing gear with a "nose-leaf" that is being flown experimentally on a company-owned Cessna 441. It is a further step in the Firestone engineering program on landing gears that developed the rubber spring type for landing gears and a variable tailwheel. These and several other Firestone developed projects are expected to be licensed soon to other manufacturers of helicopters and jet programs are completed. As indicated in a recent announcement, Firestone is expanding most of its own manufacturing of light aircraft equipment and particularly the new Firestone patented gear has turbine pumps, a constant of the landing gear, also will be suitable for business.

**GD30414-AR** GD30414-AR—Metabolism of the covalently glycosylated, the GAG-free compound which it has been established for monosaccharide by GAG, is still not understood in detail. A *in vitro* study and more engineering efforts to build polypeptides not down are the next steps for the covalent glycosylated. A small quantity of additional chains or long peptide for distribution to various lipid-protein membranes may have been observed as the main process respectively in their places. Results of their experimental investigations and membranes (transmembrane) probably will be a large factor in the final outcome. Metabolism GAG-free is moving ahead on two other subtypes of the covalently glycosylated. One of them binds the original lipid Cals utilization, and the GAG-2 subtypes membranes. One of them will be used as a biopolymer film and the other as a GAG-2 monomer.

**CUSTOMER QUESTIONNAIRE**—In addition to the items which Ask Chapman, founder of the C&A, carries out, programs a mailing out to the sponsors who will use the equipment listed, and then will not accept listing Ask as asking the sponsors to give their responses to fill out a short form, but rather, these questions in the C&A. Questionnaire individuals.

Do you find that the C&A will meet your requirements for business, social and pleasure travel? Checklisting the type of travel you will be taking, if a friend, if a visit, what would you indicate most?

And a third question checked at final has questions you may be among the prospects? (Appreciated, but many units of the type yourself do you feel you could afford at the pure cost, or your territory, per year?) Additional information on the equipment and estimates.

—EDWARD M. MANN





# No need for a "prop"!



There's no more need to "prop" a plane than to crank a car—now that Delco-Remy electrical equipment is available on popular makes of light planes. Electric starting with its ease, speed and safety adds pleasure to flying. The Delco-Remy generator keeps the battery charged and supplies ample current for lights, radio and accessories. Delco-Remy electrical equipment brings to the air all the efficiency and dependability that have made it the leader on land and sea.

## DELCO-REMY *Aircraft* ELECTRICAL EQUIPMENT



*Electric Starting for Convenience and Safety...  
Ample Current for Lights,  
Radio, Accessories*

**DELCO-REMY**  
DIVISION, GENERAL MOTORS CORPORATION

WHEREVER WHEELS TURN OR PROPELLERS SPIN



Proposed replacement for painted top airport markers, designed to aid eyes during low visibility, and can be used up to 20 miles away at night.

## New Airport Markers Pioneered by Minnesota

A new system of continuously operating airport beacon markers, designed to aid eyes during low visibility, is being pioneered by the Minnesota Department of Aeronautics. Two test beacons are at Wing, Grand Forks, near Minneapolis, and Municipal Airport at Mitchell, Minn.

The equipment is manufactured by the Lase Metallurgical Company of East Stroudsburg, Pennsylvania.

L. E. Schneider, State Commissioner of Aeronautics, reports the small airport beacons, for which he is seeking CAA approval, is a more satisfactory system of airport markers than the familiar painted runway system. Schneider says considerable danger is such markers because they are painted down to several inches in order to read them. Under unfavorable weather conditions, he says, they could cause pilots to take obstructions. Schneider reports that the state's 90 publicly owned airports all have the new beacons.

With three degrees of intensity, the beacons are constructed like scaled beam lamps, similar to those in automobiles, but emitting a simple pattern to guide them. They would radiate 14 hours a day. Those installed on airports equipped for night flying also would have a lamp directed up, such as a ceiling height indicator.

Detailed cost per unit would range from \$190 to \$370, of which the state of Minnesota proposes to pay half. Cost of operation is put at \$5 to \$5 a year.

On a moonless clear night, the beacons can be seen from the air for a distance of 18 to 19 miles and about 15 miles on the ground. When they are located among higher lights, the beacons can be picked out from the air up to ten miles away at sea level, and 15-20 miles away at night.



## Parts that Fly on THE WORLD'S MAJOR AIR LINES!

Aviation Activities, Inc. has introduced a new parts service for air lines the world over—a parts service based upon a full stock, ready for immediate shipment, of most of your requirements for the maintenance of Wright and Pratt & Whitney aircraft engines...at substantial savings. Every part shipped under the Aviation Activities emblem is new and in perfect condition...meticulously inspected by CAA Licensed Inspectors...properly packaged and correctly labeled by part number and quantity. It's engine parts service at its best!

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# THE ALLENUT

New

Internal wrenching  
self-locking nut by

ALLEN

Comparison of ALLENUT, used with Allen Bolt or Allen Cap Screw, and one-piece nut-bolt and cap screw. Note how internal wrenching prevents loosening due to vibration and shock. Cap screw for comparison is shown in broken condition.



This new internal-wrenching nut BOLDS with a weld-like grip,—self-locking in non-hardened metals. Knurled flutes are driven down into counterbored hole in screw or tightened in the nut. Yet easily removed without damage to nut or compressing parts by backing off on screw and tapping screw on head.

Using ALLENUTS with Allen Socket Head Cap Screws, the positive internal wrenching action of Allen Hex Keys drives fast, firm set-ups in the harder metals. 12-point (double-flute) Allen nutsets give 36° of wrenching swing—as compared with a normal 60°—to speed up assembly in cramped quarters.

The ALLENUT sets up fast to achieve streamlined surfaces. It features more compact designs with ratcheting economies in space, weight and material. Adds immensely to the finished appearance of any job... Precision-made of special alloy steel to Allen standards, threads tapped to a Class 3 fit.

Ask your local Industrial Distributor for complete literature. Available only through authorized ALLEN Distributors.

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52 SALES & SERVICE

## Bricker Named Auditor For Southwest Airmotive

Appointment of John C. Bricker as auditor for the Southwest Airmotive Company, Dallas, Texas, has been announced by company officials. Bricker was formerly office manager for Henry C. Buck Co., Dallas. Meanwhile, Southwest Airmotive sales division at Dallas has consorted with E. F. Goodrich Co. to be their distributor in Texas, New Mexico, Oklahoma, Arkansas, Louisiana and Mississippi. Now ready for distribution in S.W.C. territories are products representing the complete Goodrich line. In addition, the S.W.C. service division is prepared to install, repair and overhaul all Goodrich tires.



Bricker

## County Air Mapping

Southwest County commissioners at Elbert, Wash., voted in emergency appropriation of \$15,000 to have the county mapped from the air by Pacific Aerial Survey, Inc., of Seattle.

It is felt that the use of aerial photographic maps will be of considerable aid in the county survey and engineer. The survey will use the photographs to locate legal all land and locations selected as permanent for monument purposes and the engineer to locate roads.

Nearby King County made such a survey before the war and reflected in that time that the aerial expenditure for looking many holdings and better than was not known to have existed. Pacific Aerial Survey recommends such surveys each ten years.



## SEA-AIR RESCUE

Michael Angelo Chart, sighted through periscope of submerged U. S. Navy submarine Flamingo, a landed soldier at New York, Conn. Pilot was rescued when sub surfaced and picked him up. (Continued News photo.)

AVIATION WEEK, September 8, 1947

# ANOTHER South Wind CONTRIBUTION TO AIRLINE EFFICIENCY



## MODEL 926-A HOT FOOD OVEN

Developed by South Wind in cooperation with American Airlines, designed to provide a lightweight, hot food oven, rugged enough to give long trouble-free service under adverse airline conditions. Contains a stainless steel water tank and maximum aluminum with an aluminum heat shield that light weight and optimum heat distribution. Cool water to keep food hot, no cooking—50° to 100°—in sealed compartments. Refrigerator-type door with rounded inner handle and pressure lock. Removable inner door—Bart and Bart's automatic door handle instead of usual lever. Interlocking safety, flame check mechanism to include flame safety switch in transferred from convenience to pilot.



Do you have an aircraft design or fabrication problem? Perhaps South Wind can help you solve it.

SOUTH WIND'S reason in designing and building high quality heating equipment is well known. For instance—South Wind contribution heaters and exhaust gas flow exchangers, of all capacities, are used to move military and commercial aircraft to provide less fuel costs and reduce engine wear.

We have long experience in solving aircraft problems together with our

own facilities for quality fabrication, thorough testing and engineering. We welcome the opportunity to be of assistance in the solution of any problem you may have in these fields.

For an increasing confidence, write our obligation, write to South Wind Division, Warner-Warner Corporation, New Product Department (A-70), Indianapolis 5, Indiana.



SOUTH WIND DIVISION • STEWART-WARNER CORPORATION

Indianapolis 5, Indiana

AVIATION WEEK, September 8, 1947

53

UNITED STATES

ELECTRICAL TOOLS

BUILT FOR

MEN WHO DEMAND

BEST PERFORMANCE

DESIGNED first, last and foremost for useful, practical, dependable performance in production and maintenance. Engineered so they are well-balanced, perfectly proportioned to reduce fatigue and increase efficiency. Built of basic materials for long-lasting, economical service. In brief, these are THE BEST ELECTRICAL TOOLS MADE!



MODEL 4-HD

6" HEAVY DUTY BENCH GRINDER  
MODEL 4-HD

For grinding all types of edge tools and for general purpose grinding. Also for some heavy work on small shops, garages and general industrial use. 14 h.p. heavily reinforced ball-bearing motor. 6" wheels. Coarse and fine grinding wheels enclosed in protective guards equipped with adjuster rollers.

Equipped with attachment and triple switch, rubber foot and provisions for holding to bench. Bench secured on casters.



MODEL 1M1

1 1/2" CONSTANT RATE DRILL  
MODEL 1M1

Smooth feed, perfect balance, powered with recoil motor, 100% maintenance bearings, ball-cut gears, compact design.

CONTACT YOUR DISTRIBUTOR FOR PRICES AND DETAILS

Drills, grinders, cutters, planers, sanders, tappers, saws, hole saws, wire saws, grinders, wire reeling slugs, flexible shaft machines and other electrical tools.

The UNITED STATES ELECTRICAL TOOL Co.  
CINCINNATI, OHIO



AVIATION WORLD NEWS



## Moscow Report Lifts Curtain On Soviet Civil Aviation Growth

Civil airways, expanded five-fold in past 15 years, now total 93,000 miles; 1947 passenger and freight traffic expected to reach five times prewar figure.



Latest photos show interior and exterior of Soviet IL-12.



BY ANDREW STEGER

MOSCOW—Soviet air strength is coming of age. Now operating 51,000 miles of internal civil airways, the Soviet Union ranks among the world's most granded air powers in civil or service, or both in military air might.

"Soviet air transport holds first place in the world for the length of air lines and the quantity of air freight moved, and second place for passenger traffic," it was recently stated by Air Marshal P. Arshinov, chief of the Soviet Civil Air Fleet Administration. He added that "passenger traffic in 1930 should be 14 times greater than it was in 1910." He did not say what the 1910 figure was.

During the past fifteen years, Soviet civil airways have expanded nearly five times over, and are being extended. This year alone, about 7,500 miles of lines opened.

► **Domestic Other Transport**—The analysis of Soviet airways is proven that of any other form of internal transport in the Soviet Union, whether rail, road or waterway.

One main trunk route extends from Moscow across Siberia to the Pacific, with stops at the main junctions of the Trans-Siberian railway. Another routes across the Southern Ural from Moscow to Tashkent and Alma Ata. Travelers reach from Moscow south to Leningrad, west to the capitals of the Baltic States, in Minsk and Kiev, and south to the Caucasus. A new survey is being opened to link Tbilisi with Odessa via the Black Sea ports Batumi, Sochi and Sevastopol.

Moscow, the heart of the Soviet civil airways system, is connected by air with the capitals of the 16 republics in the USSR.

Flares rising off from Moscow mark the capital of fourteen of these republics on the same day.

► **Expenditure Trip**—The most expensive air trip one can take from Moscow is the flight to London on the Boeing Stratocruiser. This passenger ticket costs 3,500 rubles, the equivalent of five months' pay to the average citizen. For several times the lesser investment of 35 rubles per passenger, 11 1/2 day carriage. For shorter routes, the lesser investment is 132 rubles, 33 1/2 days.

An average mid-flight traffic of Soviet airlines this year is expected to reach a total five times prewar passenger level. Total passenger load in 1947 is expected to top by 400,000 the 1936 mark. During the first nine months of 1946 the Soviet civil airways were reported to have transported 230,000 passengers and about 30,000,000 pounds of air freight.

Flying from Moscow's two main air-ports, regular civil airway planes connect the Soviet capital with about 50 cities, including 15 outside the Soviet Union. In 1946, 58 planes daily were landing and taking off from the capital.

► **Moscow's Major Airport**—The civil air port at Vnukovo, 15 miles from Moscow, is the city's major airbase both for internal and for international airlines.

Opening on a 40-minute express schedule, large comfortable motor buses ply between the Soviet capital and the airport. Every day Vnukovo sees action more than 1,100 airplanes, among them many which arrive from and depart to foreign lands. Customs inspection is also carried out here for passengers arriving from abroad. Air freight is dispatched and received at Vnukovo field.

Konstantin do not follow the American practice of using safety belts in taking off and landing. Nevertheless, chief of the Civil Air Fleet Arshinov stated recently that "safety by available statistics Soviet air transport holds first in the world for safety of air travel."

All pilots of the civil air planes are skilled aviators, many with distinguished wartime service and with well-planned safety long civil service records. Among the pilots operating out of Vnukovo are several "bomber aces."

► **Civil Aircraft**—The majority of the civil air fleet transport and passenger planes in power are Russian-produced DC-3s, but a new plane designed as the "IL-12" which has been developed by S. I. Zhukovskiy, designer of the famous "Bomber" bomber, was announced to replace these planes in time. The "IL-12" which costs 27, is expected to develop a speed about 60 miles faster than the Douglas plane.

## AN AIRCRAFT HARDWARE

...by the Carton...or the Carload



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Rivets • Pins • Pulleys • Cable  
Accessories • Washers • Spacers •  
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• Dzus Fasteners

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If you don't see it here, ask for it! Your  
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One of the nation's largest suppliers of Standard  
AN Hardware for the Aviation and Allied Industries

Shouldn't our flights have been made on  
very different wings out of Moscow? A  
larger passenger transport seating 70 per-  
sons has been developed by the noted Rus-  
sian designer A. N. Tupolev. This plane  
was first shown publicly at the Aviation Day  
celebrations Aug. 4.

The Aviation Day air show also disclosed  
a series of jet-propelled planes, designed by  
some of the Soviet Union's leading aircraft  
designers—Yakovlev, Lavochkin, Mikoyan,  
Goussak, Sukhoi, Dushkin and Tupolev.  
To judge from current comment in the  
Soviet press, jet-propulsion is a field with  
which Russian aeronautical engineers have  
long been familiar. "The modern airplane  
is the material expression of the latest  
achievement in scientific thought," stated  
a recent *Pravda* editorial, adding: "Our  
native land which first gave the world the  
scientific theory of flight and then the first  
jet jet-propelled airplane has made a  
great contribution to the rapid progress of  
aviation. The development of aviation tech-  
niques, the application of jet-propelled en-  
gines, the increase of speed, altitude and  
altitude of aerial fights, the utilization of  
radio—all are now tasks before those who  
design and build aircraft as well as those  
who fly in them."

► **Expanded Airways.** For all main trade-  
lines the Soviet aircraft industry, which during  
the war developed an output capacity of  
41,000 planes per year, is to supply mil-  
lions of aircraft. Light machines capable  
in pilot and to serve as to be produced  
for the local markets. Mass production for  
the Soviet cities in the national network,  
while local aircraft industry has major  
centers to reach the world scene.

One of the problems still only partially  
solved by the civil air authorities is the per-  
centage of good roads and the establishment  
of good ground transport between the airports  
and the cities they serve. Whether the city  
and airport communities in Moscow and  
other cities are satisfactory, it takes about  
an hour to go, for instance, to get from the  
Leningrad airport to the city by available  
surface transport as it does to travel by air  
from Moscow to Leningrad.

► **Multi-Purpose Use-Apart** from transport  
of passengers and as freight planes at the  
Soviet civil air fleet performs an increased  
of special functions.

Civil air pilots long wish to fly high-  
speed passenger transport lines to facilitate  
speedy repair work. During the war, they  
could not schedule all flights for the flying  
line. In the Arctic we find they attach  
the pack for loads, making air bases one  
very. To meet some measure from rail and  
waterway they transport trucks and rail  
and waterway, long in young fields to  
such. Long ponds and many scattered  
ships to help build up growing fields as  
we devastated lands. For planning in the  
USSR, they transported and the long-range  
radio plane from Central Asia. In Cen-  
tral Asia civil aviation policies employ sev-  
eral driving loads of cattle to pasture.

## The *NEW* Marquette model 3V hydraulic wiper

is the result of 10 years of experience in this highly specialized  
field. It incorporates every feature that is desirable and practical, based  
on thousands of installations on military, naval and commercial aircraft.

### gives you all these advantages

- Blades are synchronized in all times
- Clearance is peak of blade will not  
roll off
- Blades may wipe in same or opposed  
direction
- Blades are parked and locked when  
wiper is not in use
- Universal drive arm and no rod  
require minimum stock of parts
- Wiper blades are easily replaced
- Pressure is removed from system when  
not in operation
- Master unit may be located at any  
position in the airplane
- Stroke on each window can be varied
- Hydraulic tubing eliminates linkage  
control and provides additional  
space for mounting other instru-  
ments
- Master unit and window units are  
universal, providing maximum in-  
terchangeability of parts
- Constant torque valves through-  
out stroke
- Uniform stroke at all speeds
- Simplicity of design, resulting in  
lower first cost and reduced main-  
tenance expense



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SUPPLYMENT OF CUBIC WEIGHT CORPORATION  
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AIR COMPRESSORS • PRECISION PARTS AND ASSEMBLIES



**STRENGTH** travels with **LIGHTNESS**  
in the Boeing 377 Stratocruiser

Weldwood Honeycomb walls add rugged stiffness . . . subtract weight

These new Boings . . . they're big. Able to carry 63 passengers cross country, or 114 on commuter flights. With less fuel, they can't tolerate any deadhead weight.

Every square inch of material must justify itself in three ways: in lightness, in rugged strength, and in dimensional stability.

Weldwood® and Armoform® Honeycomb boost an amazingly light strength-to-weight ratio. The multilayered core weighs as little as 4 lbs. per cu. ft. The

facing can be beautifully grained matched veneer, pleasing aluminum, stainless steel, or plastic. Honeycomb's mechanical properties, rigid strength, and insulating qualities allow the plane designer many advantages.

Honeycomb can be made of impregnated cloth, paper, Fiberglas, or other material. Armoform and Weldwood Honeycomb are available in stock sheets, cut-to-size panels or custom fabricated for in place specifications. Get full engineering data on these specialties for aircraft materials. Write today. 78-0000 P. G.



Installing Armoform Honeycomb wall of cabin dressing room in the Boeing 377 Stratocruiser.



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## AIR TRANSPORT

### Trains Are Favored

## Survey Shows Slight Decline In Enthusiasm For Air Travel

Young people and recent users continue to be biggest boosters of plane transportation, according to study made for Association of American Railroads.

The growing trend in public preference for air travel which continued through the war years has been halted, and railroad transportation has gained slightly in passenger favor, according to results of a recent nationwide survey.

An interpretation of the survey is that it is expected to persist among the young, the study disclosed. But the survey apparently has a major purpose in boosting this popular mode among older people, lower income groups, business of rural areas, women and large segments of the population in the South and Middle West.

► **Majority Favor Train.**—Of 2,583 persons interviewed by the Dynamic Research Corp. for the Association of American Railroads 51 percent said they would prefer to travel by train if not for speed. Forty-four per cent expressed preference for air transportation, and 5 percent were undecided. Among the 1,318 respondents, 152 said they had used the airplane recently, and 2,200 had not used it.

In a similar study made last year, 49 percent of those interviewed preferred air transportation, 45 percent said travel, and 6 percent were undecided. While the air train lost 2 percentage points between 1946 and 1947, they held none of the opposite gains made between 1943 and 1945. During that period, public preference for rail travel dropped from 51 percent to 40 percent as air transportation increased in favor from 35 percent to 46 percent.

► **No Travel Enthusiasm.**—The research organization emphasized that despite their gain in favor with the public generally the railroads have not improved their standing with the two groups which have remained loyal. Most enthusiastic about air travel—young people and persons who had not used a commercial flight recently. In 1946, 62 percent of the air travel passengers under 30 years of age preferred to travel by rail transportation, while in 1947 the figure advanced to 45 percent. Thirty-one percent of the younger age group now favor rail travel, and few percent expressed no opinion.

Among persons of all ages who had made

a recent commercial plane flight 55 percent favored air travel against 79 percent last year. Only 13 percent of the reported rate who had flown recently favored rail road transportation at this year's survey, and 6 percent were undecided. But among those who had not flown recently, 55 percent preferred rail travel against 49 percent for air transportation while 5 percent stated that they were undecided.

► **Business Groups Studied.**—While 65 percent of the interviewees with persons under 30 years of age showed a preference for air travel over rail transportation, the figure dropped to 45 percent in the 30-44 age group and to 35 percent among people 45 years old and over. Of those 45 percent of the respondents in the upper and middle income groups favored air travel against 45 percent for rail transportation, only 17 percent as the lower income bracket preferred air travel compared to 57 percent favoring rail transportation.

In cities of 100,000 population or over 14 percent of those interviewed favored plane travel and 41 percent rail transportation. But in communities with between 10,000 and 100,000 population the percentage favoring air travel dropped to 15 percent. In towns of 2,500 to 25,000 population no preference was only 41 percent said in rural areas, 37 percent.

► **Women Less Favorable.**—Of 1,465 men interviewed, 67 percent favored air travel if their were equal and 67 percent rail transportation, with 5 percent undecided. Only 49 percent of the 1,113 women interviewed expressed preference for air transportation, against 54 percent for rail travel and 6 percent undecided.

Results of the for West appear to be most enthusiastic about air transportation. Fifty-four percent of the persons in that area favor plane, 40 percent prefer rail travel, and 6 percent are undecided. In the East, 46 percent prefer plane travel (46 percent rail), Middle West, 44 percent plane (31 percent rail), and in the South, 50 percent plane (36 percent rail).

► **Safety Factor.**—The public regards rail transportation as preferable to air travel in three major respects, according to the survey. That is safety, speed and reliability. Speed was given as the railroads' outstanding advantage, although the public also believes the air carries off a higher quality per unit weight than the railroad. As for safety, 60 percent of the 2,583



### FARMER'S SHOPPING TRIP

As Alaska farmers who recently made extensive purchases of livestock and supplies used in Seattle had his new passenger loaded down in Alaska Airlines C-47 which he rode back to Anchorage. Loaded to the cargo zone doors, when, perched on a tractor not other than gear. Frequent status by long-distance and owners become overnight business in Alaska last year, and now railroads again are crisscrossing northern transportation.











# FIRE-PROOF!

inside and out!

C.A.A. Listed

## CMH FLEXIBLE METAL HOSE

For: Fuel, Oil, Instrument, Vacuum Lines,  
CO<sub>2</sub> Lines downstream of directional control valve



CMH leadership in the market of FLEXIBLE HOSE has produced two types of flexible metal hose that have been fully flameproofed, valuable means reducing fire hazards in flight.

1. CMH FLEXIBLE FUEL-PROOF HOSE (CMH-EP-4) has been granted a Fire-Proof approval by C. A. A. and is so listed.

2. CMH FLEXIBLE FUEL-RESISTANT HOSE (CMH-FR-1) complies completely with C. A. A. criteria for fire resistant hose.

In addition to internal and external flame tests, both types of hose have been subjected to rapid and vibration and burst tests. Flexibility tests have been accomplished by generated stress from vibration and pressure.

Both types are available in sizes from 3/8" to 1 1/2" I.D., with standard AN fittings. Heavy duty Weather Resistant demonstrates the superior safety of CMH EP-4's, with metal hose fittings, over the usual forms of flexible hose and plastic hose fittings.

Undamaged after  
10 hours of  
continuous internal  
fire...

In compliance with C. A. A. CMH Fire-Proof hose has been subjected to internal fire tests for 10 hours continuous internal fire without damage. In one recording C. A. A. inspectors noted as an "extraordinary, prompt recovery" of hose subjected to the most severe flame test, subject to an internal flame of up to 1000° F. — without failure. There is safety in hose that is not only fire proof but also undamaged.



You select the **RESISTANCE** You control the **SAFETY** of this hose for use under working conditions of aircraft, from aircraft to the ground. It is a hose called by the best quality of Chicago Metal Hose Corporation.

**FLEXCON** — stronger CMH products, which save cost and industry for more than 25 years.

## CHICAGO METAL HOSE CORPORATION

Maywood, Illinois • Plants: Maywood and Elgin, Illinois

### NWA in Sea-Air Post With Steamship Line

Northwest Airlines and American Steamship Lines have completed arrangements providing maximum inter-company cooperation for the convenience of overseas travelers wishing to use both modes of transportation.

Under terms of the agreement, both NWA and ASL, throughout the world will sell tickets for either air or water travel or a combination of both. American Steamship Lines operates mainly in the Pacific but also to other points in the world, while Northwest currently speeds its new route to the Orient.

The two companies will accept each other's exchange rates, the joint air and sea line tickets with ASL and the Maritime Commission, and accept reservations to a schedule profitable to both carriers. Round trip ocean tickets will be offered at a 10 percent discount.

Commenting on the agreement, the Rev. As. Committee, vociferous advocate of a government policy which would permit steamship companies to control ocean, said it was a "pioneering step in the right direction."

### New West Coast Link

West Coast Airlines has joined its long service list with an air surface route link from Seattle to Bellingham, Wash., via Everett, Mt. Vernon and Astoria.



### SMORGASBORD

Swedishman Airlines System is doing what comes naturally to its trans-Atlantic jet out of New York: SAS Swedes are now smorgasbord chefs after takeoff, and passengers can make a complete meal out of the delicacies or merely sample the assortment in its appetizer in the hot lunchbox. Sample SAS smorgasbord: housing with meat cream, "Kibbles," Scandinavian cream, smoked salmon, Scandinavian seafood, shrimp salad, lobster, cucumber, "Figs," "green fish" steamed cod, Westphalian ham, best choice: five pure, melted and pure cheese and Old Swedish cheese. Note other delicious delicacies in pages 101.



TANOLITE

## TOP IT OFF WITH TAN-O-LITE!

A remarkable new upholstery fabric! Developed in cooperation with automotive and aircraft engineers, TAN-O-LITE has extraordinary strength... lightness... durability... beauty. Its stain-proof finish is easy to clean, never cracks or peels, withstands years of abuse. You'll admire its supple drape, its glowing, stay-bright colors, its rich leather effects. And this vinyl-coated fabric is completely **FLAMEPROOF**. Its versatility, its low cost makes it practical for a multitude of other uses, too. Write today for complete literature and details.



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from take-off  
to landing



**HARRISON**  
OIL COOLERS

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**JOVIC PASTUSHIN INDUSTRIES, INC.**  
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## We Prefer U. S. Airlines

Despite the addition of huge luxury liners like *Eng-land's* two queens to the stewardship lines, trans-Atlantic air service by the three American international carriers continue to improve.

American Overseas and Pan American are starting daily non-stop flights from New York to the British Isles. No foreign company is even approaching this standard in schedule frequency, operating and maintenance efficiency, crew selection and training, airworthiness and communications standards, and host weather approach and landing systems. U. S. airlines are well ahead of their foreign competitors.

But because the U. S. companies still are plagued by complications in passenger treatment, the foreign carriers are wooing substantial numbers of American passengers.

Aviation Week July 28 observed that foreign operated airlines over the Atlantic are "making up to hills and crests" over the Atlantic for what they lack in operating efficiency. "We also worry that the American public doesn't require too much about technicalities which are not mentioned in the ads."

These references caused vigorous protests, naturally, and the truthfulness of the statements on infinite operations was challenged.

It so happens, however, that on Aug. 19 a well known U. S. air transport official, highly respected by the industry for his knowledge of the subject, sent a letter to several other executives, mainly with U. S.-owned international airlines, acknowledging his belief that standards of foreign air transport companies generally are inferior to those of our own international lines.

The letter is so important to the traveling public, as well as to air transport officials who did not see it, that we quote a substantial portion of it.

"Fundamentally, in international operations we are faced with a very serious problem which in my estimation will be more keenly felt competitively by the summer of 1948 but is becoming more and more apparent today. The consensus of opinion leads me to believe that our passenger service aboard aircraft, as well as the handling of passengers at terminals, does not compare with the same service being given by the foreign flag airlines based overseas. This includes ticketing, handling of baggage, service aboard aircraft, including preparation and dispensing of meals and the various other little details which we learn service."

"Regardless of the service delivered by the international foreign carriers, I as an individual would not ride on any of their lines with the probable exception of one on which I would accept passage if necessity dictated.

This is based upon my knowledge of the training of pilots, maintenance, and the safety level, but I am not John Q. Public. He sees only the service and, from all outward appearance, the foreign international carriers are flying the same equipment and the outside of the airplane is just as clean and in some instances cleaner than our aircraft.

"Consequently, he tells his friends of the wonderful service and food provided aboard the foreign carriers, in comparison to the poor service and poor food afforded by the U. S. international carriers. This problem is not a fictitious one, nor is it an insurmountable problem, but is a very vital one and we only have to turn the pages of history back to a parallel case of the American passenger shipping industry prior to World War II, in comparison to the ships operated by the French, British, Dutch, German, Swedish, and Norwegian. The safety code observed aboard the foreign ships was much inferior to the safety observed aboard the American ships, but regardless of this fact the American public as a whole traveled aboard the foreign ships because they were afforded better service, better food, and better recreational facilities.

"Competition is most evident this year. This is particularly true over the Atlantic but is becoming more evident in the South Atlantic and in the Pacific.

"Once the impression is created that U. S. international carriers afford the public poor service in comparison to the foreign operated international carriers, it is going to be exceedingly difficult to dispel this impression, regardless of advertising. Consequently, it is much easier to attempt to improve the service today in order to hold the market than to lose the market and attempt to regain it."

This is a man speaking from a wealth of experience, not only in the United States. He is presently interested in convincing fellow air transport executives to the need of re-evaluating personal service to the passenger. Merchant-marine Americans are keenly conscious of the need for mechanical and operational perfection, but in the transportation field they have usually under-rated the business value of personal service and comfort.

We have every confidence in the ability of U. S. airlines to continue to meet the foreign operators' service, and to match their standards of comfort and service. As the letter writer points out, however, until our airlines do raise their standard of comfort and service, we shall see hundreds of Americans looking to foreign owned air lines in preference to our own, which—of these luxury loving travelers only knew it—are built, operated, and maintained under the highest standards in the world, by the most skilled personnel in the world.

ROBERT H. WOOD

The advertisement features a large, stylized illustration of a heart with a pulse line, labeled "FLUOROSCOPE OF YOUR AIRCRAFT'S HEART...". Below this, a smaller illustration shows a propeller and a pulse line, labeled "SPERRY ENGINE ANALYZER".

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- The new Sperry Engine Analyzer will enable your flight engineer to keep his eye on the pulse of his engines — promptly visualize the slightest irregularity in engine function. In the analyzer reference the flight engineer can determine at any time during flight, patterns that show the characteristics of engine vibration, ignition system performance, and mechanical action between magneto and between engines. These characteristic patterns detect, locate and identify the malfunctions and impending failures that may occur during flight operation.
- When the airplane comes into the

airport, specific engine maintenance needs are already known. Small mechanical corrections can then be made in minutes instead of the hours formerly required to locate the cause of malfunction. This results in an increased number of possible flying hours per day and greater reliability in meeting schedules.

- Our Aeronautical Department will be glad to supply complete details.

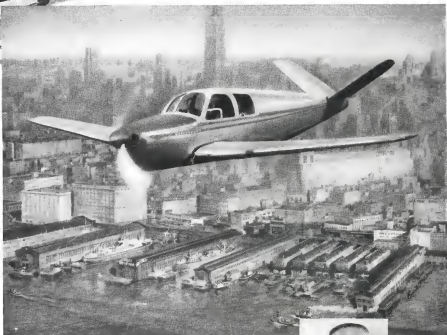
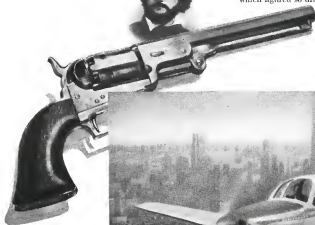


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The four-place Bonanza is a fast airplane, cruising at 172 mph. but does it with the economy of 165 hp at a cost as low as one cent per passenger mile! Add the Bonanza’s limousine-

like luxury, its quietness, and its easy maneuverability in and out of the smallest fields—and you have air transportation that is tailored to fit the businessman’s needs!

The Bonanza comes fully equipped—two-way radio, landing lights, instruments, heater, electric retractable landing gear, flaps, controllable propeller and other refinements. Your Beechcraft distributor will be glad to

*Walter H. Beech*, pioneer in aeronautics, who produced the Beechcraft Bonanza as a modern “equalizer” in business transportation.

demonstrate it—and to discuss its adaptability to your transportation needs. We are still filling a large backlog of orders. Additional ones will be filled in sequence.

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